Kong THE CLOUD NATIVE API PLATFORM

Technical Deep Dive In **Web Assembly** for **Kong Gateway**

Caio Ramos Casimiro | Vik Gamov

Barcelona, Spain

March 2023,

Agenda

What you'll learn

What are API Gateways

Why Kong

What is WasmX

What is Proxy-Wasm

How it all fits together
in the Kong Gateway

WHAT IS API
GATEWAY?

Are you the Keymaster?

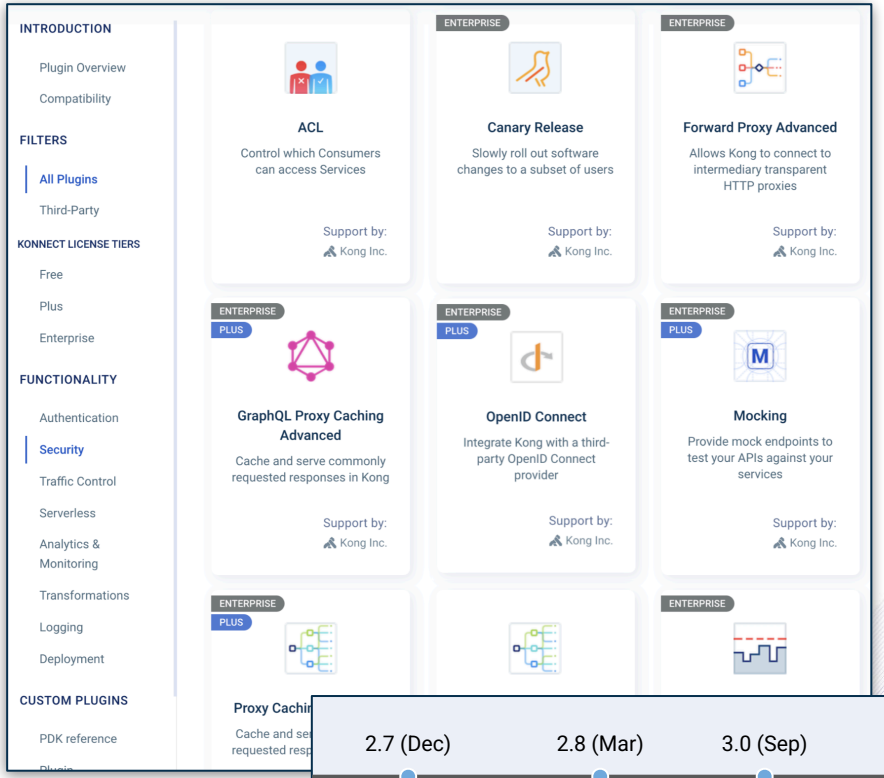
I want you to be nice...
...until it's time to not be nice

WHY KONG?

Kong Gateway

Today

- 🌍 most 😍 API gateway
- Thriving **OSS community**
- 100% API/declarative config driven
- Multi-⛅ and multi-protocol
- 🚀 **performance**
- Rich OOTB plugin ecosystem



2.7 (Dec)	2.8 (Mar)	3.0 (Sep)	3.1 (Dec)
●Secret Management P1 ●Consumer Groups ●KM OIDC Wizard	●FIPS-2 ●Secret management (Beta)	●Router optimization ●Plugin ordering ●Secret manager-GA	●SAML2 ●OAS validation ●AppDynamics

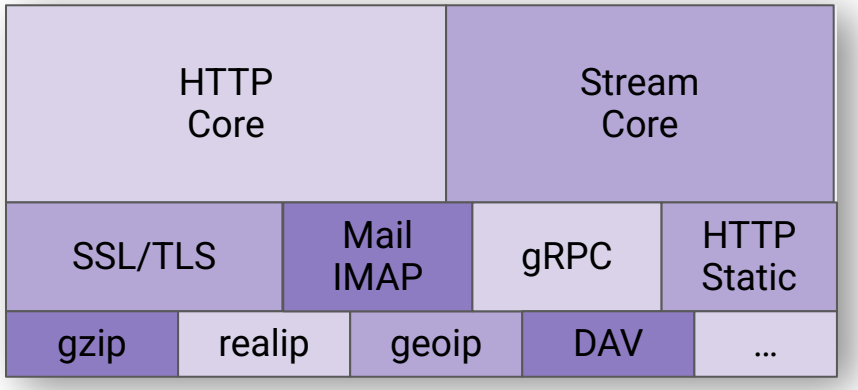
Nginx Architecture

Overview

C10K problem

Uses async socket apis (e.g., epoll)

Provides Event-based API for module extensions



Phases:

access
content
log
...

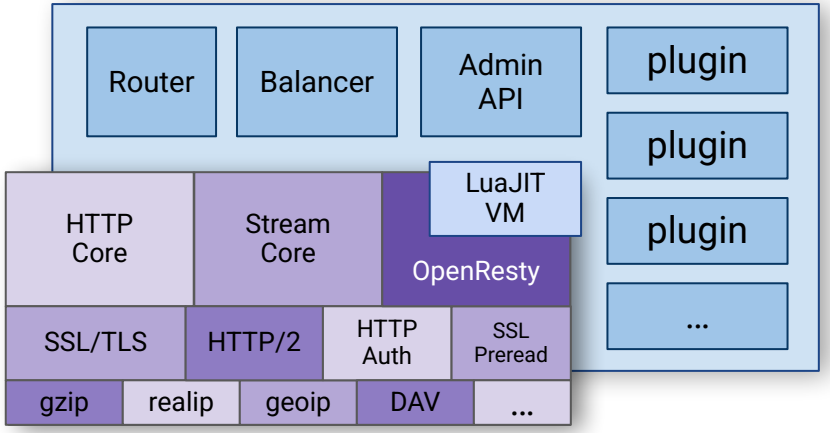
Kong Architecture

Overview

Leverages OpenResty

Runs on LuaJIT

Exposes Nginx more conveniently

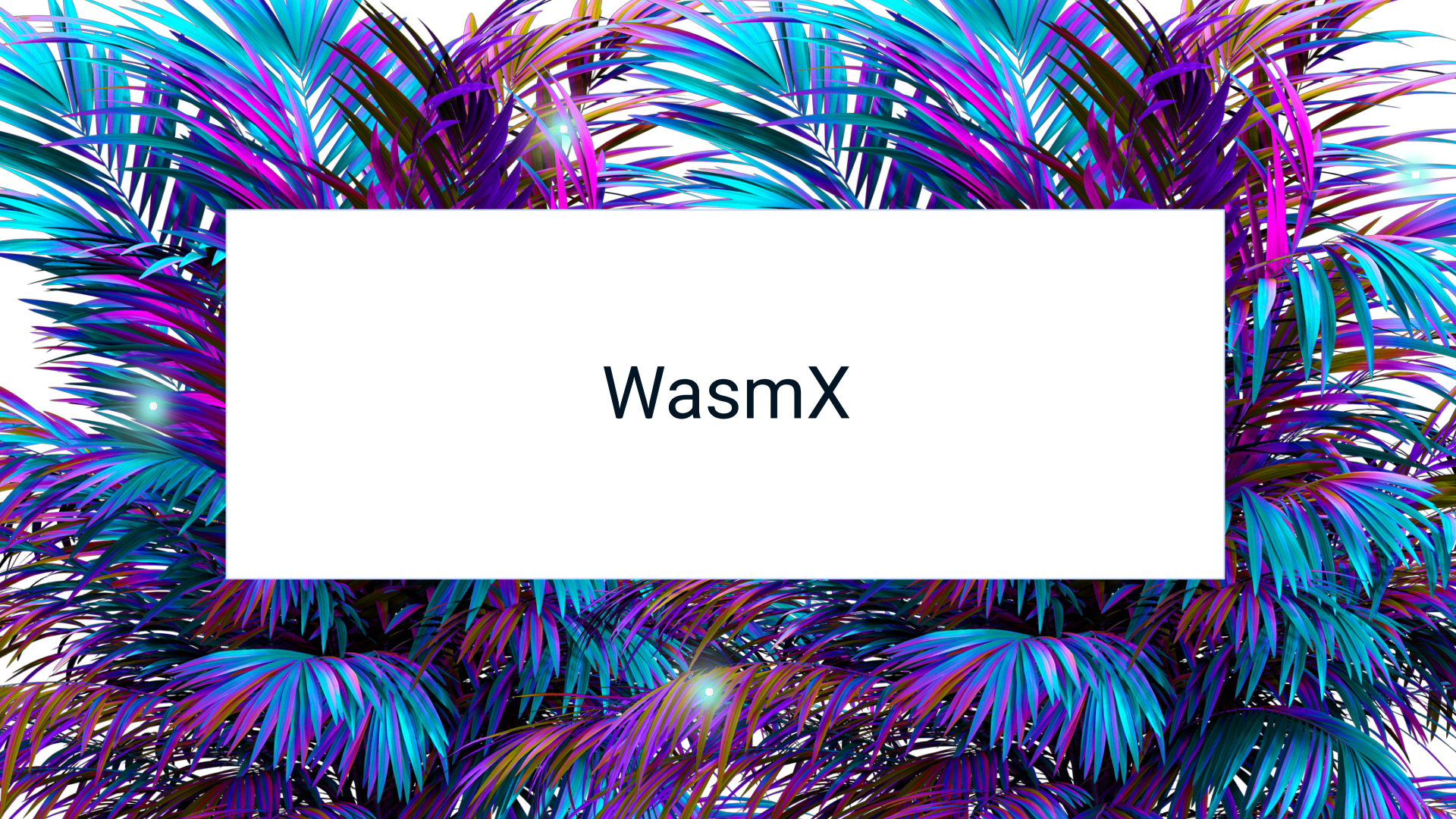


Extensibility
in Kong

Plugin Development Kit
(PDK)

Types of plugins and
supported languages

Kong's API for
plugins


WasmX

What is WasmX

An Nginx module for embedding Wasm

Developed by Kong

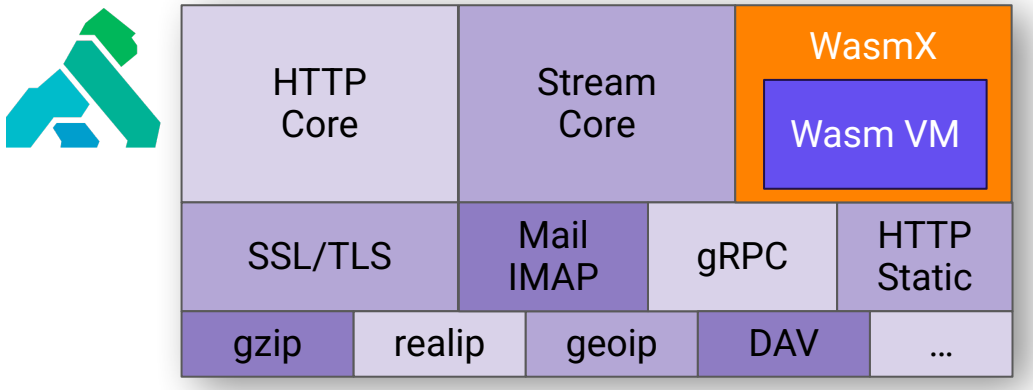
Runs a Wasm VM inside Nginx

Connects Nginx functionality
to Wasm code

Supports multiple VMs:
Wasmtime, Wasmer, V8

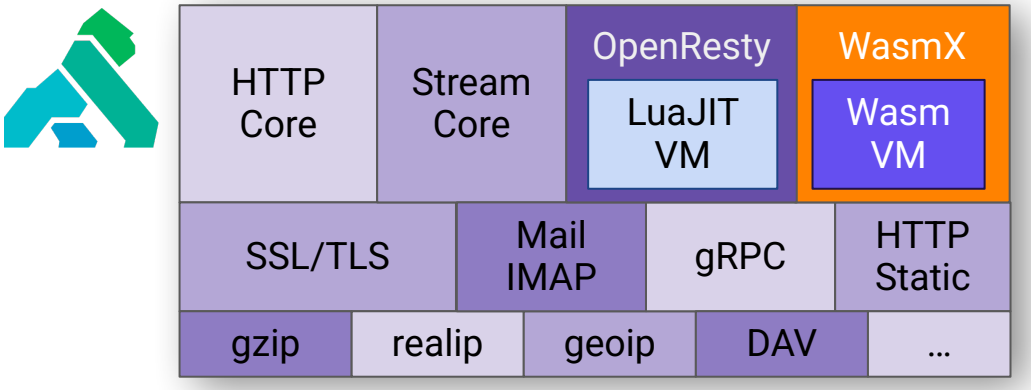
How WasmX fits

It is compiled into the Nginx binary



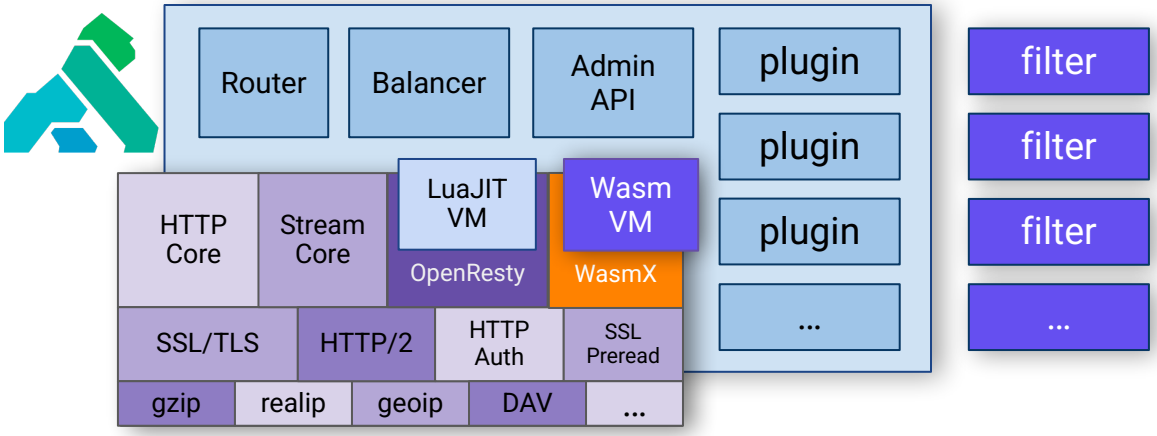
How WasmX fits

(and yes, you can run both!)



Running plugins and filters

In build of Kong including WasmX, you can load Proxy-Wasm filters



BUT HOW WILL I
IMPLEMENT ALL THESE THINGS?
THAT'S THE NEAT PART - YOU DON'T
imgflip.com

What is proxy-wasm

Definition and purpose of proxy-wasm

Adoption by Envoy and implementation in WasmX

Language-independent ABI

What is Proxy-Wasm

A gateway-agnostic API for proxy filters

Language-independent ABI for implementing proxy APIs (SDKs)
Rust, Go, C++, AssemblyScript...

An evolving specification

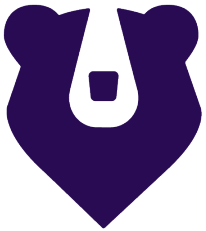
Gateway-independent:
- Implemented in Envoy
- Being implemented in WasmX

Why *proxy-wasm*

Benefits of using proxy-wasm with WasmX

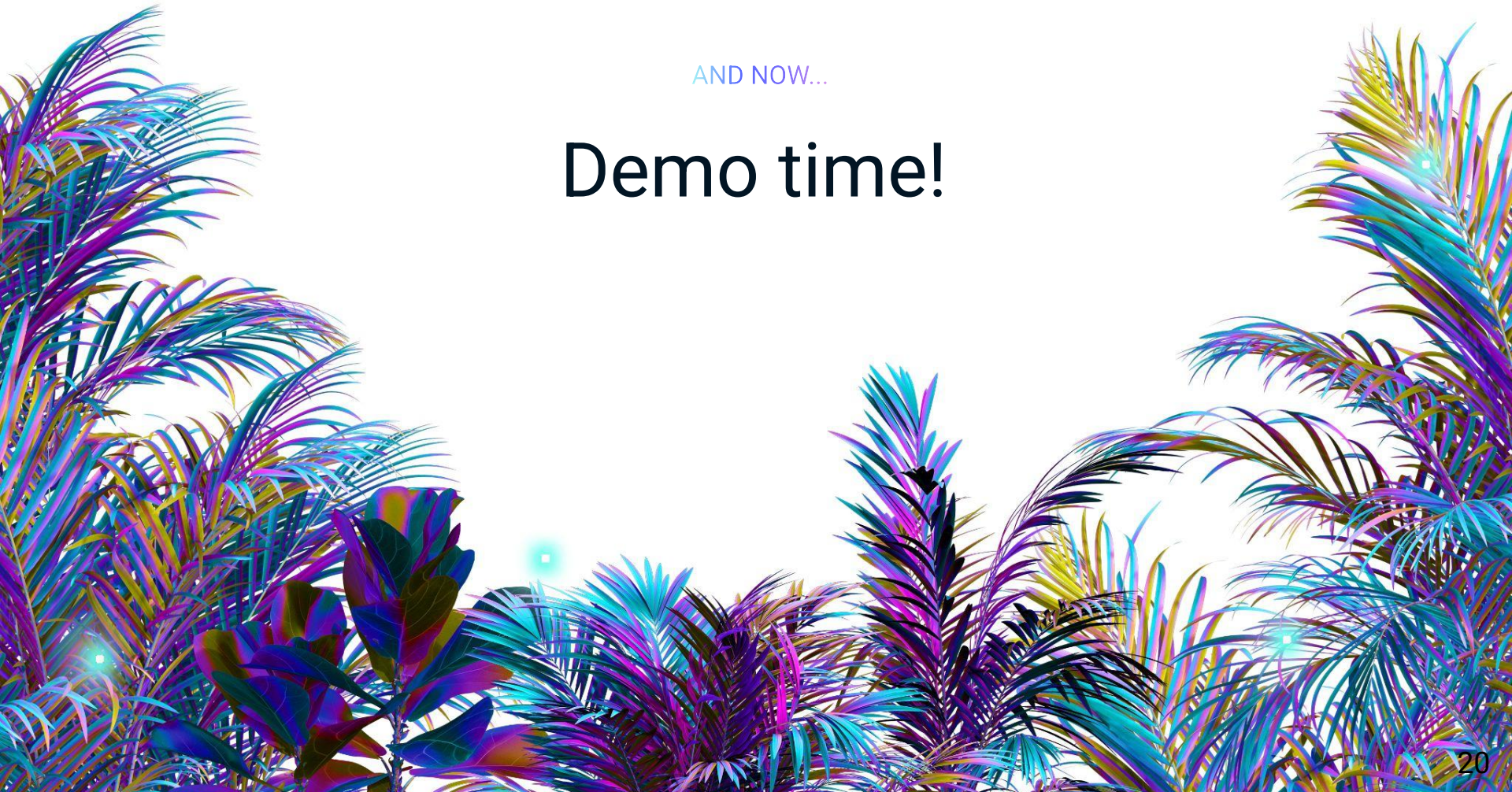
Interoperability between Kong Gateway and Kuma, Kong Mesh

Support for industry standards



AND NOW...

Demo time!



To recap…

What we've learned

WasmX embeds a Wasm VM

WasmX implements *Proxy-Wasm*

Kong Gateway runs both Wasm and Lua plugins

Tech Preview Availability

We want your feedback!

https://incubator.konghq.com